MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2018/2019

TDB2121 – DATABASE DESIGN AND MANAGEMENT

(All sections / Groups)

4 MARCH 2019
2.30 p.m. – 4.30 p.m.
(2 hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 5 pages (excluding cover page) with **5 QUESTIONS** only.
2. Attempt all questions.
3. You are allowed to use calculators in this examination.
4. Please print all your answers in the Answer Booklet provided.

SECTION A: Answer ALL (30 marks)

QUESTION 1

Assume that ATECH University wants to analyse the attendance of students in various major. The fact table has the following schema with 7 main attributes:

Attendance Fact Table (Student_key, Faculty_key, Major_Key, Campus_Key, Room_Key, Time_Key, Subject_Key)

(a) The administrative staffs want to aggregate the students' attendance according to year, quarter or by semester. Sometimes, the attendance will be aggregated by daily, weekly or monthly basis. Based on this information, identify the suitable attributes to be included for time dimension. [3 marks]

(b) The following are the number of records and number of attributes in each dimension. In general, the average byte per field is 8.
Student = 15,000 records; 10 attributes
Faculty = 8 records; 3 attributes
Major = 36 records; 3 attributes
Subject = 75 records; 3 attributes
Campus = 3 records; 3 attributes
Room = 2500 records; 4 attributes
Time = 450 records; 6 attributes

(i) Estimate the total number of rows for this warehouse. [1 mark]
(ii) What is the storage needed (in bytes)? [1 mark]

(c) The university is interested to analyse the attendance based on campus, major, faculty and time. Suggest a suitable aggregate function to perform this analysis. Please describe with examples. [2 marks]

(d) The data warehouse is initially designed with star schema. However, a lot of redundancy is discovered in address (one of the attribute in student dimension). How to eliminate redundancy? Please illustrate your solution. [3 marks]

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QUESTION 2

Assume that a Library Management System (LMS) has been created.

(a) There are THREE types of metadata. Define each metadata and give examples that involve LMS. [4.5 marks]

(b) Securing the data in LMS is one of the main concerns. In your opinion, how can one secure the data in LMS? Please identify AT LEAST TWO methods to secure the data in LMS. [2 marks]

(c) Table 1 displays part of the content in Table Borrow. Create BorrowList.xml based on Table 1. [3.5 marks]

Table 1. Content of Table Borrow

User_ID	Book_ISBN	Borrow_Date	Due_Date	Return_Date	Penalty
12356	978-1-234-56789-7	2018/11/27	2019/02/26	NULL	NULL
12695	978-2-122-45633-9	2018/10/21	2018/12/20	2018/11/01	NULL

Continued.....

QUESTION 3

(a) Given that a lawyer may have many clients and a client can approach more than one lawyer at different time. Based on the given information, illustrate the object oriented representative diagram. Please include the necessary attributes in the diagram.

[5 marks]

(b) The branches of company XYV are located in USA, China, Japan and Malaysia. Fully distributed database management system (DDBMS) is needed to support the operational flow of the business. Due to the differences in countries, each branch has different operating system and different system platform. The hardware and software used to support the business operations are different too. Assume you are a database consultant:

(i) Please advise the company which kind of fully distributed database should be implemented. Justify your answer. [2.5 marks]

(ii) Will data replication enhance the query performance? Kindly justify.

[2.5 marks]

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QUESTION 4 and QUESTION 5 are based on the entities in Figure 1. Figure 1 shows the entity relationship diagram (ERD) of a sales department. SQL commands are needed to solve the query problems in QUESTION 4 and QUESTION 5.

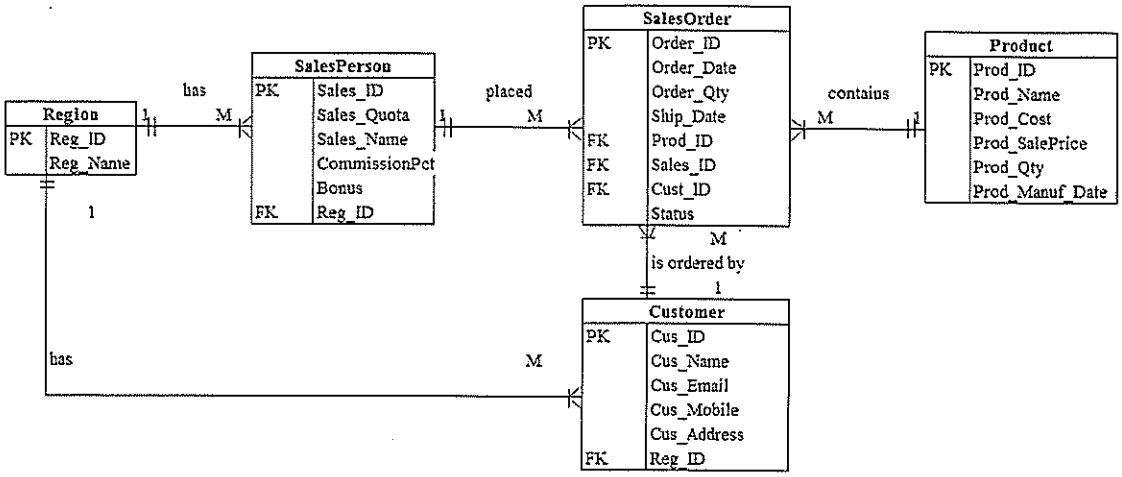

Figure 1. ERD of Sales Department

QUESTION 4

Assume you are the database designer. Solve the following questions by using appropriate SQL commands.

(a) Alter the table SalesOrder by setting the auto increment to 10000. [2 marks]

(b) Change the structure of table Product by adding the check constraint so that the product quantity is not less than 1. [2 marks]

(c) The sales manager wants to know how many orders have been achieved by each sales person with order date from January to June 2018. The report must display the sales person ID, sales person name and the number of order per sales person. (Assume the date format is YYYY-MM-DD) [3.5 marks]

(d) List the number of customer by region name and sort it in ascending order. [2.5 marks]

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